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The Elements of Physics. By HENRY S. CARHART and HORATIO N. CHUTE. pp. 382. Allyn & Bacon.

The *Elements of Physics* is intended as a text-book for classes in high schools, or schools of a similar grade, where the mathematical preparation of the student is of the most elementary character. For this reason the subject has been presented in such form that only the simplest ideas of geometry and algebra are required, while the only mention of a trigonometric function occurs in the discussion of the tangent galvanometer. The difficulties that are met with in preparing a satisfactory text-book under these restrictions are obvious. In some respects it would be easier to write an elaborate treatise. The authors have been unusually successful, however, in avoiding the faults which are too often met with in books of this class. The statements and explanations are, in general, brief but clear. In no case has accuracy been sacrificed for apparent simplicity. Although not free from faults, the book cannot fail to be of assistance in raising the standard of elementary teaching.

Of the different branches of physics that are discussed, the treatment will strike the reader as least satisfactory in the case of electricity and magnetism, although it is difficult to tell just where the fault lies. It is to be remembered, however, that the subject of electricity is probably the most difficult in physics to present in an elementary manner. The omission of all mention of double refraction and polarization in the section on light seems unfortunate. It is doubtless intentional, and probably results from the experience of the authors in the difficulty of teaching these subjects to an elementary class. I cannot help thinking, however, that a few well-written pages devoted to the simpler phenomena of polarization would add to the value of the book. The numerous illustrative experiments that are described throughout the book will doubtless prove of considerable value to teachers. These experiments are, in most cases, so simple that they could be performed in the class-room, or by the student alone. The illustration of physical laws by reference to the familiar facts of everyday life is also deserving of mention, the sections on heat and sound being in this respect especially satisfactory.

—From review by Ernest Merriitt in the *Physical Review*, July-August, 1893.

Advanced Arithmetic. Inductive Business Course, with a Suggestive Outline for Teachers, by WM. M. PECK. pp. 250. A. Lovell & Co., N. Y.

This book furnishes material for a four years' course, beginning with the fifth school year, following the author's *Primary Lessons in Number*, which covers the first four years.

The subjects dealt with include only those directly connected with ordinary business transactions. It embraces only the

simpler business arithmetic, avoiding complex and difficult problems requiring mature judgment.

"The author has had in view the needs of the many children who are compelled to leave school at an early age and who have no time to spend in learning the definitions and theories of arithmetic, but who need a great deal of practice in the essentials of the subject," (Preface). The manner in which the different subjects are treated, is concise and businesslike. All set rules are omitted. The problems are concrete, plainly stated, and well graded. Percentage is made practically a continuation of Fractions. The five traditional "cases" and the continued arbitrary use of the terms Base, Rate, Amount, and Difference, give place to development by means of Analysis. Profit and Loss as a separate subject, disappears, and the problems are dispersed throughout the three General Problems of Percentage.

"An important feature is the arrangement of the lessons, each of which consists of fifteen problems, five mental and ten written," (Preface). Concise and usable forms of analysis are rarely found in the so-called Written Arithmetic. Throughout this book are excellent models of analysis, helpful both to teachers and pupil.

And help, in this matter, is sorely needed. Pupils are doing a maximum of figuring and a minimum of thinking. There is too much written work and too little mental drill.

In another important matter, the book is not so helpful. The author seems to have fallen into the prevalent and fatal error of discontinuing all special drill in the fundamental operations, when the pupil leaves the primary grades. Among the two hundred business problems at the beginning of the book, evidently intended for a review, none are of sufficient length to test and improve the ability to add; and throughout the book this holds true. In the detailed outline for the use of teachers, there appears not even a suggestion to continue the drill in the fundamental operations.

Unless the excellent work done in the primary grades be followed up by continued drill in the intermediate classes, the pupil soon loses both speed and accuracy, and the gradual return to slow and inaccurate work is inevitable. It is a fact, determined by actual tests, that many Grammar School classes do not add as well as the Primary classes in the same system of schools. The author evidently deems the short concrete problems to afford sufficient practice. They are entirely inadequate.

Accuracy and rapidity in the fundamental operations are, at this age of the pupil, the most important results of successful teaching, and a text book should not be silent on so important a matter.

We have looked at the book, thus far, as a text book for children. Mr. Peck, however, considers it "Advanced Arithmetic," and with this text book would "finish" the subject. His idea

of the scope and office of arithmetic can best be understood by giving a partial list of the subjects eliminated. Greatest Common Divisor, Least Common Multiple, Longitude and Time, Domestic and Foreign Exchange, Equation of Payments, Ratio and Proportion, Square and Cube Root, Partnership, Arithmetical and Geometrical Progression, Mensuration, the Metric System and other subjects are swept away with the remark that "all obsolete subjects and terms have been purposely omitted," (page iv). Teachers are advised to "do nothing with methods and subjects which are obsolete with business men," (page viii). This theory would fit the book better if business men did nothing but deal in groceries and figure interest. Unfortunately for this theory, they also deal in Brooklyn bridges and "figure" on the construction and balance sheet of a "White City."

By adopting the plan suggested by Mr. Peck, arithmetic will indeed be a child's study, a "preliminary" subject; preliminary to trouble for all academic pupils; for is not Arithmetic the working medium in all mathematics?

Let the subject be simplified for children, let the Grammar School complete a simple business course, but let us not emasculate the science. Let the High School do successfully, in one-half the time, what we fail to do in the Grammar School.

With Advanced Arithmetic in its proper place, as a required academic study, including Mental Arithmetic restored to its former usefulness and vigor, there will come a demand for an Advanced Arithmetic containing most of the "obsolete" subjects.

Hollis E. Dann.

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Outlines of the Modern Education in Japan. Translated and published by the Department of Education. Tokyo, Japan. pp. 218. 1893.

This volume, which comes to us from the Imperial Japanese Commission to the World's Columbian Exposition is a revelation. Students of education must be forever grateful for the impulse given by the World's Fair which has led to the production of so many admirable monographs in various parts of the field. Such a one was Deutschland, höheres Schulwesen im 19. Jahrhundert, (see *School Review*, vol. 1, No. 6, p. 378). But none will be read with greater interest than this admirable account of education in Japan, nor will any fill a more pronounced gap in our easily accessible educational data. The work opens with a brief history of the educational administration in Japan. When the Code of Education had been carried out in 1873 the number of children in school was about 1,180,000; in 1891 the number was 3,630,000. A valuable supplement to this statement is found at the end of the volume in the table showing increase in expendi-